

Traffic and Admission Clearance for Patient on Ambulance

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ABSTRACT : *Patients in critical condition request for an ambulance. At times up on reaching the hospitals they are denied of admissions. Patients conditions, address details, contact no's etc details are provided while requesting for an ambulance. Though admission process requires only this information lack of connectivity between ambulance service and the hospitals is the main reason why the patients end up searching for the hospitals that would allow admission. This Project provides an Ambulance service which is a credible health care entity that could send messages to multiple hospitals to see which hospitals are willing to provide admission for the patients. That lets the patient decide which hospital he would prefer to get admitted. The ambulance driver upon swiping the RFID card in the ambulance would intimate the traffic poles in the route about the arrival of the ambulance. The message well in advance about the emergency will be transmitted to the signal poles and green light will be issued for the ambulance. This project belongs to HealthCare domain. The Technologies used to develop this project are IoT, Android, MQTT, Java Web and the Hardware required to build this project are Node MCU (2), RFID Scanner, RFID Card, LED Lights, Android mobile.*

KEYWORDS: *Node MCU, RFID scanner, RFID card, Java web, MQTT, Android.*

I. INTRODUCTION

India is the second most populous country in the world and is a fast-growing economy. It is seeing terrible road congestion problems in its cities. Infrastructure growth is slow compared to the growth in number of vehicles, due to space and cost constraints. Also, Indian traffic is non-lane based and chaotic. It needs a traffic control solution, which are different from the developed countries. Intelligent management of traffic flows can reduce the negative impact of congestion. This particular project is designed for the cities with heavy traffic like Bangalore where the roads are full jammed every time. Most of the times the traffic may last at least for 100meters. In this distance the traffic police may not hear the siren from the ambulance. So, he may ignore this. Then the ambulance has to wait till the traffic is left. Some times to leave the traffic it takes at least 30 minutes. So, by this time anything can happen to the patient. So, this project avoids these disadvantages. According to this project, if any ambulance comes near or when the ambulance at emergency comes to any traffic post the traffic signals automatically stop the signals and give green signal for the ambulance. RFID is a wireless technology that uses radio frequency electromagnetic energy to carry information between the RFID tag and RFID scanner. Some RFID systems will only work within the range inches or centimeters, while others may work for 100 meters (300 feet) or more. The patient in the ambulance may be denied for the admission in the hospital due to lack of appropriate equipment and doctors in the ambulance. In this situation, the patient should find other hospital where he can fulfill his requirement. This may lead to adverse effects in emergency situations. To avoid such problems, we designed an android application in which the patient can find the nearest hospital which can provide appropriate treatment to him without any delay.

II. LITERATURE REVIEW

Literature survey:

This project is related to the following papers

B. Janani sharadha, G. Vijayashri, T. Subha "Intelligent Traffic Signal Control System for Ambulance Using RFID and CLOUD" : This paper illustrates about creating a android app that connects both the ambulance and the traffic signal station using cloud network. This system makes uses RFID (radio frequency identification) technology to implement the Intelligent traffic signal control. The basic idea behind the proposed system is, if the Ambulance halts on the way due to a traffic signal, RFID installed at the traffic signal tracks the RFID tagged ambulance and sends the data to the cloud. After the acknowledgment for the user through the mobile app, the particular signal is made Green for some time and after the ambulance passes by, it regains its original flow of sequence of signalling. If, this scheme is fully automated,

it finds the ambulance spot, controls the traffic lights. This system controls the traffic lights and save the time in emergency periods. Thus, it acts as a life saver project.

• **Dr. A. Balamurugan, G. Navin Siva Kumar, S. Raj Thilak, P. Sivakumar** “Automated Emergency System in Ambulance to Control Traffic Signals using IoT”. : This automation is the process of making the electronic device to communicate between themselves to serve the purpose of the human. The one of the major field that concentrate on the automation is Internet of Things creatively called as IoT. This project is based on the IoT and cloud to save the human life at critical situation. This project is to establish the communication between the traffic signals and the ambulance so that the traffic signal can respond to the arrival of the ambulance and respond according to that. When the traffic signals are changes its states according to the position of the ambulance it can able to make a free way for the ambulance. Thus, this project will act as a life saver.

• **Pratiksha Berwal, Kiran Apte, Shweta Dumbre, Madhuri Gawli** “Intelligent ambulance with accident detection and rescue system “

The objective of our project is to minimize the delay caused by traffic congestion and to provide the smooth flow for emergency vehicles. The concept of our project is to green the traffic signal in the path of ambulance automatically with the help of RF module. So that the ambulance can reach the spot in time and human life can be saved. The control unit monitors the ambulance and at the same time it controls the traffic light according to the ambulance location and thus arriving at the hospital safely.

• **Niketa chellani, Chirag Tahilyani** “Traffic Congestion Detection and Control using RFID Technology”.

The objective of this paper is to propose an effective scheme for road traffic management which is fully automated and foolproof considering the rate of ever going traffic in urban areas. In this paper they discussed the existing and most widely employed technologies for traffic detection and congestion control with their limitations and also propose an alternate model for the same which employs RFID technology. The basic idea used here for traffic management is to detect and control congestion by using a decision-making algorithm which determines how the traffic light operates based on the information collected from the RFID device.

III. HARDWARE REQUIREMENTS

- Node MCU
- RC522 RFID Card Reader/Detector
- Light emitting diodes
- Bread board

IV. BLOCK DIAGRAM:

Traffic signal pole

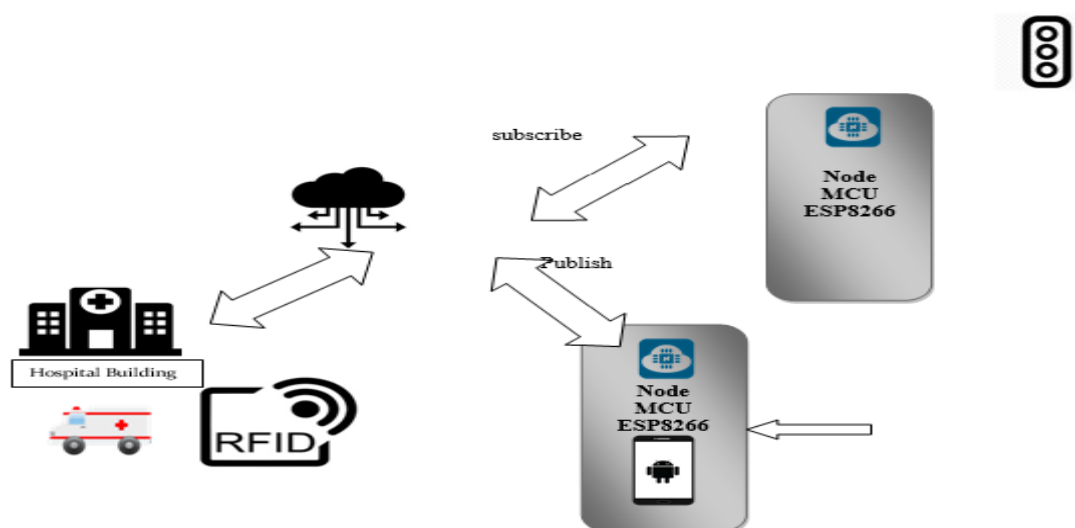


Figure1 Block diagram

Node MCU Features:

- High Level of Integration
- 32-bit Tensilica MCU
- Low Power Management
- Robust Design
- Smart Light
- Smart Button
- Smart Plug
- Smart Apps

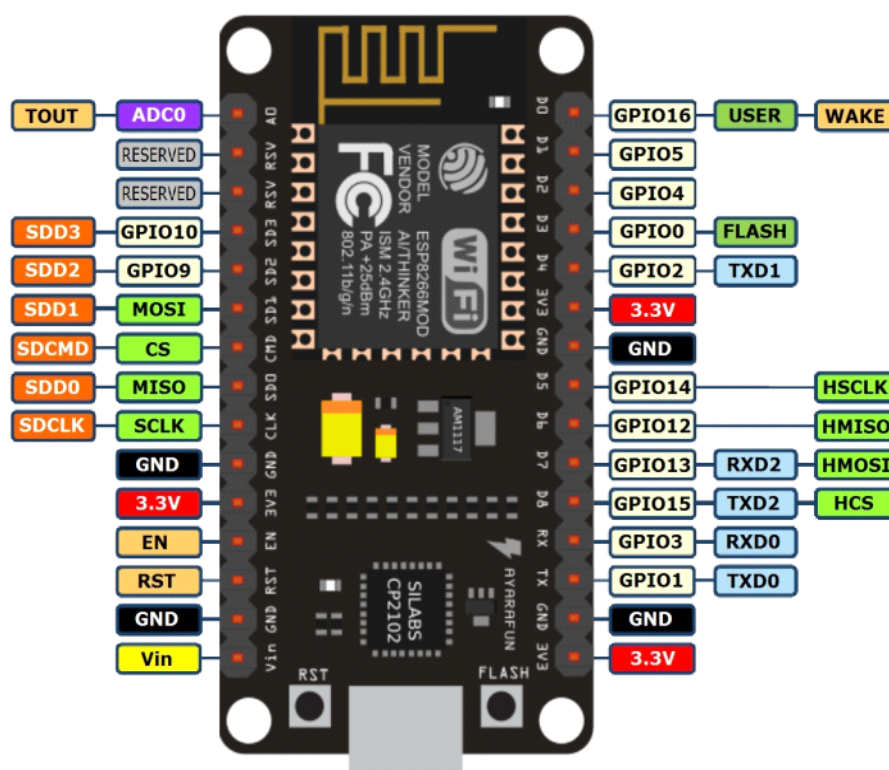


Figure2 Node MCU Pin diagram

RC522 RFID Card Reader/Detector

- Module Name: MF522-ED
- Working current : 13—26mA/ DC 3.3V
- Standby current : 10-13mA/DC 3.3V
- sleeping current : <80uA
- peak current : <30mA
- Working frequency : 13.56MHz
- Card reading distance : 0~60mm (mifare1 card)
- Protocol : SPI
- data communication speed : Maximum 10Mbit/s
- Card types supported : mifare1 S50、mifare1 S70、mifare UltraLight、mifare Pro、mifare Desfire
- Dimension : 40mm×60mm
- Environment
- Working temperature : -20—80 degree
- Storage temperature : -40—85 degree
- Humidity : relevant humidity 5%—95%
- Max SPI speed: 10Mbit/s

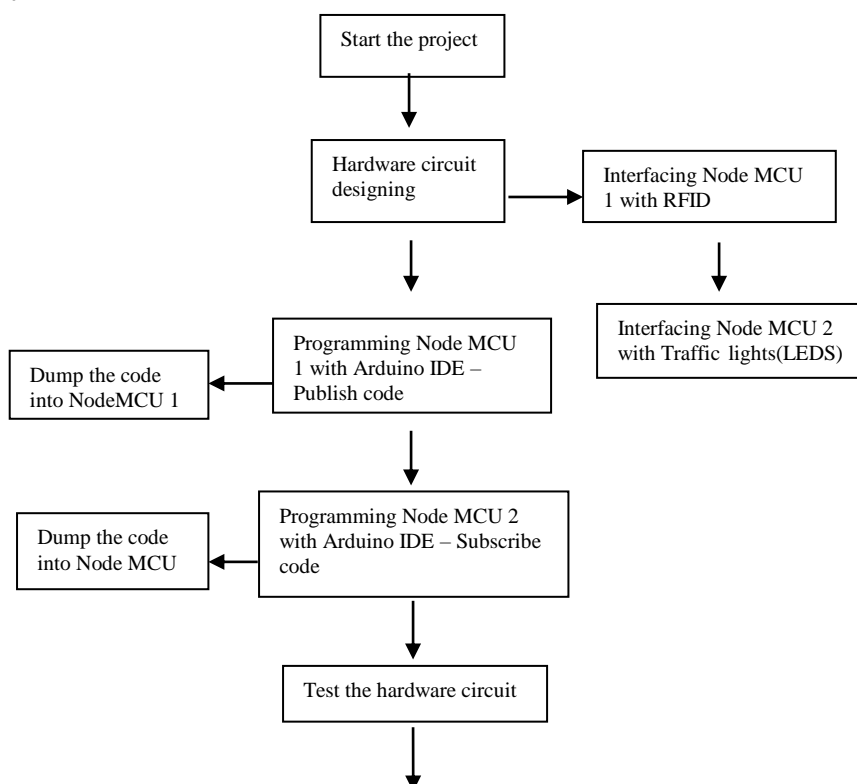


Figure3 RFID reader



Figure 4 RFID card

Project Flowchart



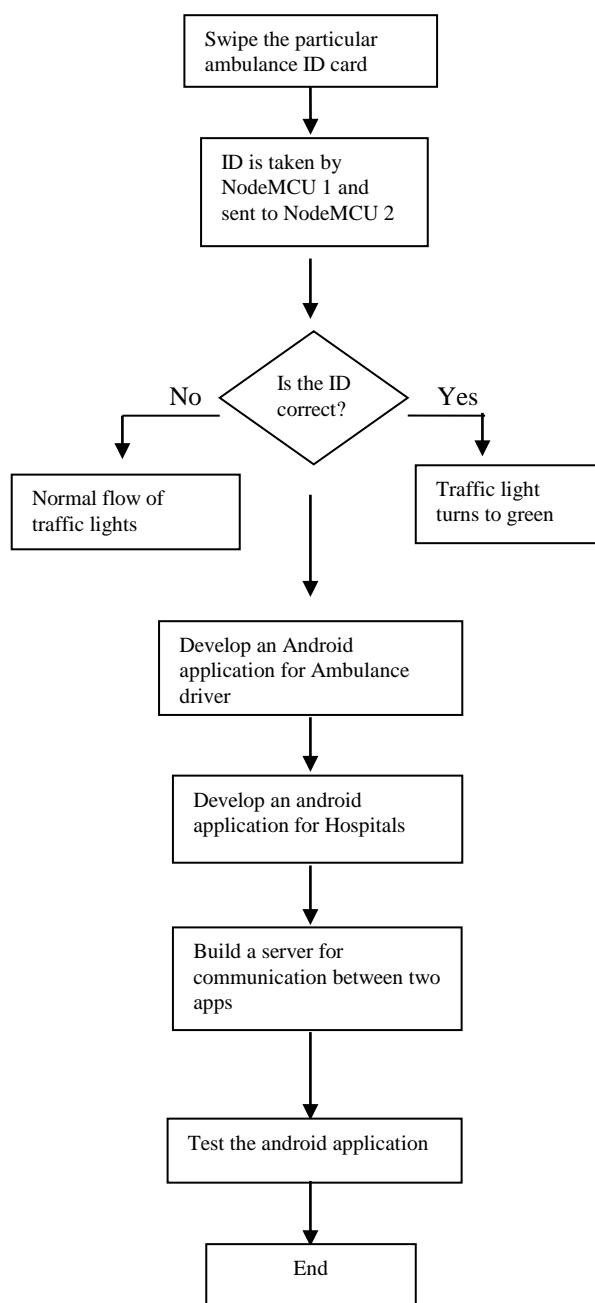


Fig 5 flowchart

V. SOFTWARE REQUIREMENTS

- MQTT
- Arduino
- Android Studio

Technology used: IOT

VI. SOFTWARE DESCRIPTION

The Internet of Things (IoT) is about interconnecting embedded systems. It brings together two evolving technologies: wireless connectivity and smart sensors. Combined with recent advances in low power microcontrollers, these new "things" are being connected to the internet easily and inexpensively, ushering in a second industrial revolution. These connected embedded systems are small microcontroller-based computers that do not require a human interface.

Instead of interacting with a human these systems use sensors or other advanced detection mechanisms. These sensors collect data, data that has value and that is part of a larger system.

VII. RESULT AND DISCUSSION

RESULTS:

1. Android application for ambulance driver and hospitals are designed using Android studio.

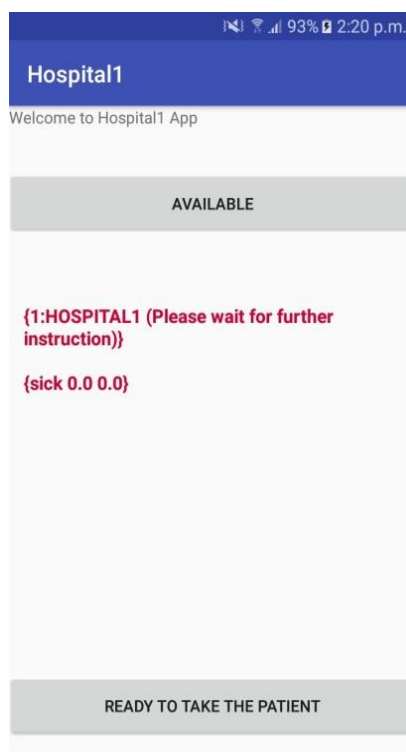


Figure6 Hospital app

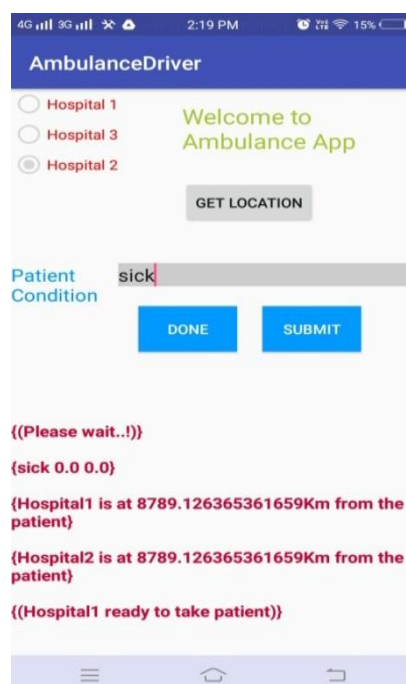


Figure7 Ambulance driver app

2. Intelligent traffic signal control system for Ambulance using RFID and MQTT is designed. And MQTT publish and subscribe codes for publishing and subscribing Ambulance ID is developed using Arduino IDE.

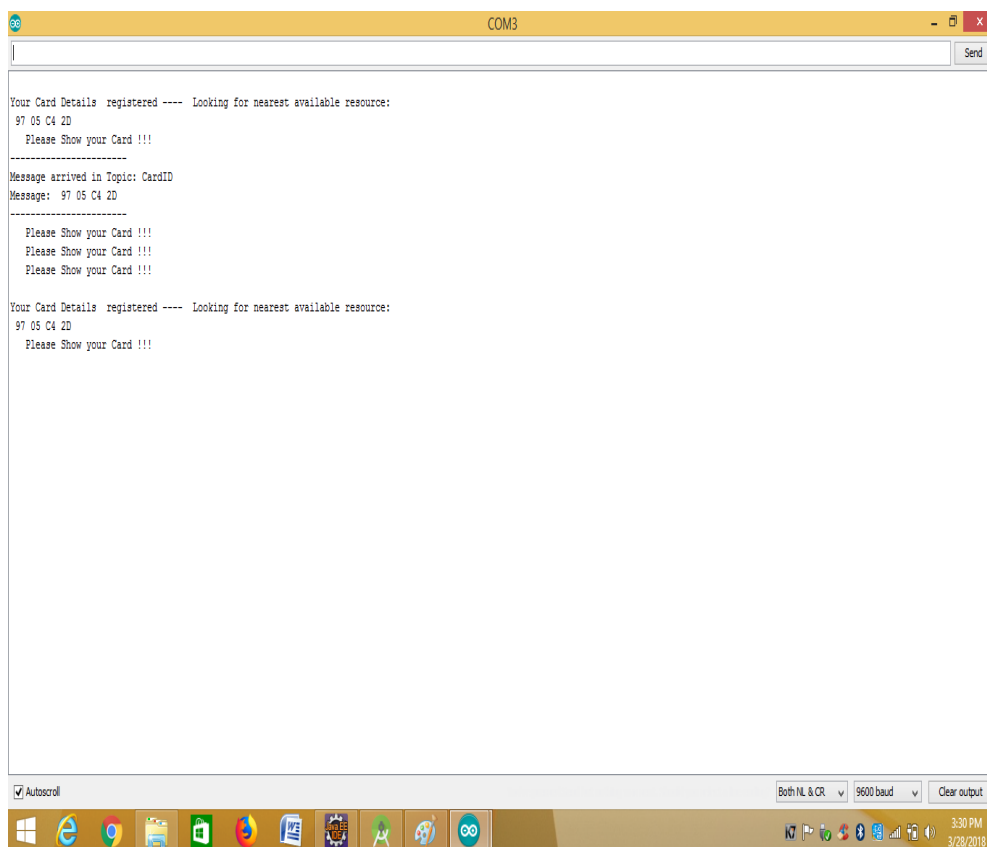


Figure8 Serial monitor showing the MQTT RFID publishing message

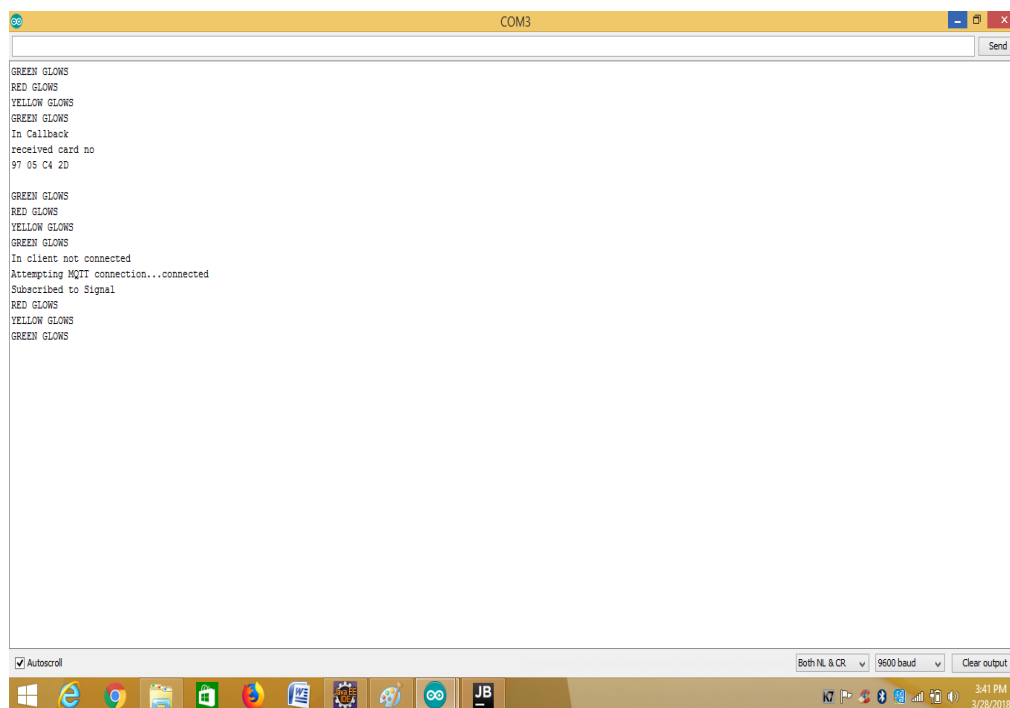


Figure9 Serial monitor showing the normal flow of traffic signals

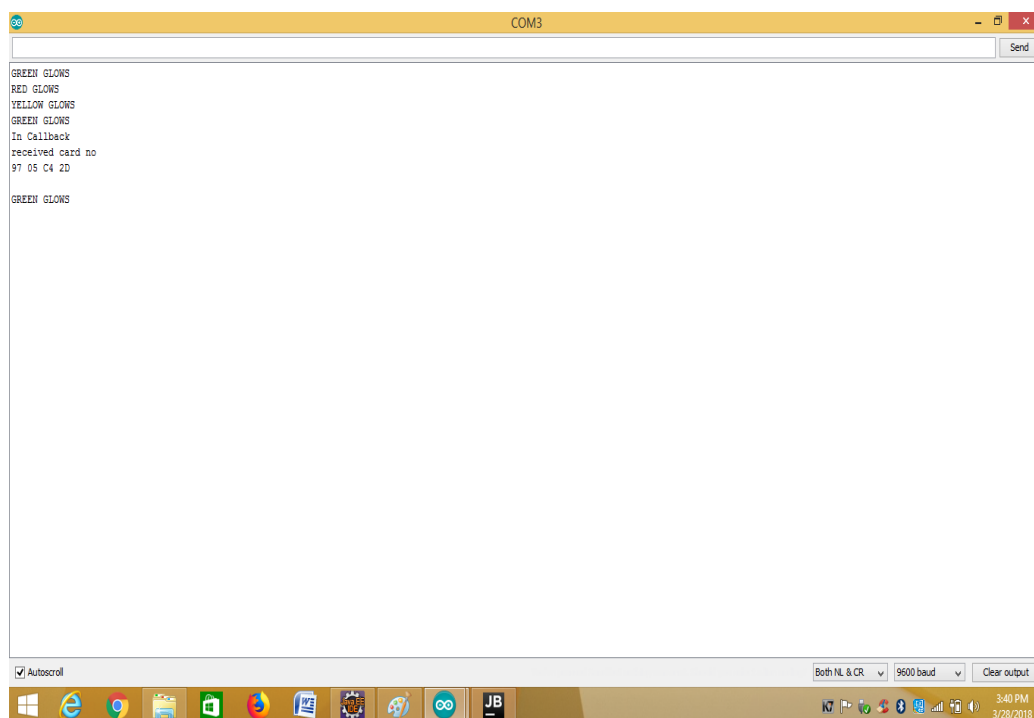


Figure10 Serial monitor showing the MQTT RFID subscribed message and glowing green light

3. Server required for communication between two apps is built using eclipse

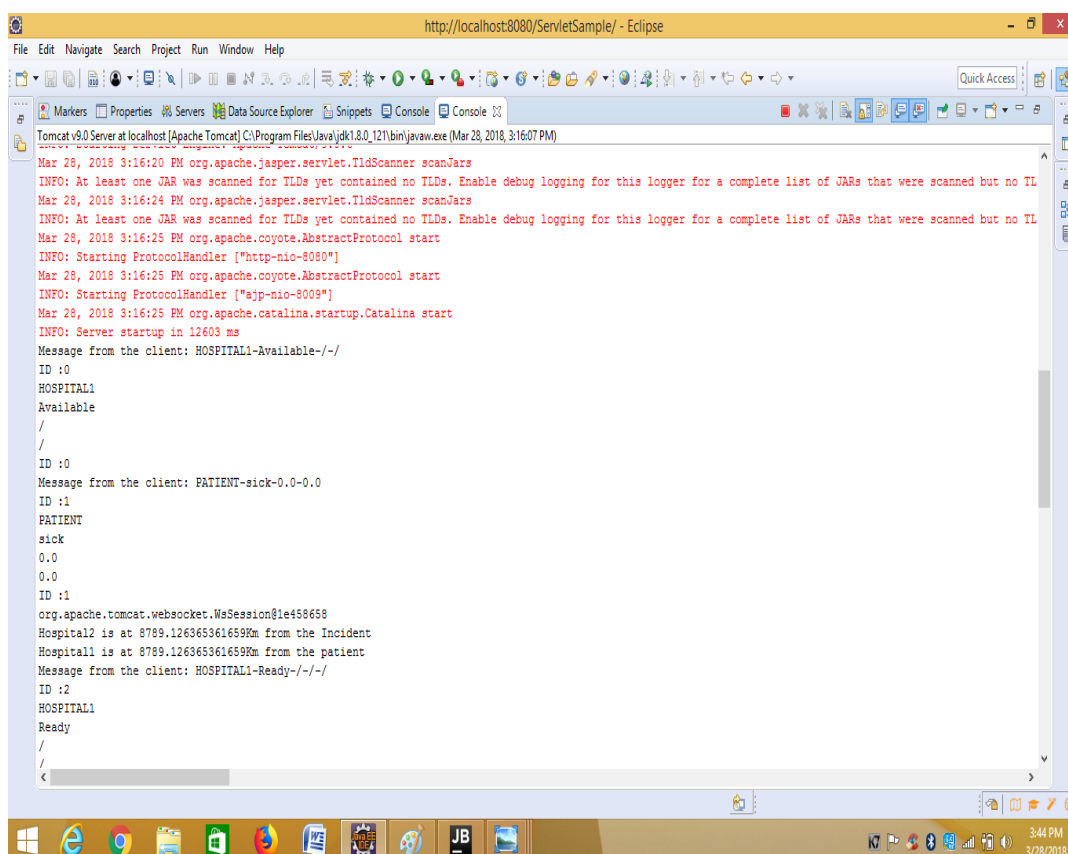


Figure11 Sever database showing the received messages to the server

Applications

- It can be applied for other emergency vehicles like fire extinguisher, police vehicles etc.
- The android application can be applied for checking the availability of a table in a restaurant.

Advantages

- Prior intimation to the hospitals about the patient condition and time of arrival.
- It involves less human intervention.
- It is a life saving project.
- Increasing traffic handling capacity of roads.
- It helps the patient to reach the hospital in time.
- It is best suited for the Indian traffic management system.
- This project is perfectly feasible to implement.
- It is cost effective.
- Scope for further expansion

Limitations

- This project can be applied to the present traffic management system in India but it is not connected to the real time hospitals. As this is an experimental project location of hospitals is hard coded into the android application.
- The android application developed in this project does not consist of maps to show the route to the hospital as there are no real time hospitals implemented in this project it is not required.

VIII. CONCLUSION

As the total system is based on internet of things, it is completely automated. It is very easy to implement and it requires very less human intervention. It enhances the working of present traffic and admission clearance process in the country. As it is a life saving project by implementing it the patient in the ambulance can reach the hospital by taking admission in advance without being halted in the traffic. With this project we can clear both the admission and traffic congestion to make it easy for the patient to reach the destination in time.

IX. FUTURE SCOPE

- By commercializing this app we can sell it to all the real time hospitals. Hence storing the location of all the hospitals in the database so, after clearing the admission process the ambulance driver app will show the route to the selected hospital. And the route is sent to the traffic signal pole which comes first in the way and the remaining signals poles in the selected route will give green light according to the speed of the ambulance.
- This android app can be further developed to connect to blood banks and request for the required blood group.

REFERENCES

- [1] B. Janani Saradha¹ G. Vijayshri¹ T. Subha² ¹ UG students, Department of IT, Sri Sairam Engineering college, ² Associate Professor, Department of IT, Sri Sairam Engineering college, "Intelligent Traffic Signal Control System for Ambulance Using RFID and CLOUD".
- [2] Dr. A. Balamurugan¹, G. Navin Siva Kumar², S. Raj Thilak³, P. Selvakumar⁴ HOD, Professor, Sri Krishna College of Technology, Coimbatore – 42, Tamilnadu, India "Automated Emergency System in Ambulance to Control Traffic Signals using, IoT".
- [3] Pratiksha Berwal¹, Kiran Apte², Shweta Dumbre³, Madhuri Gawli⁴ Department of Electronics & Telecommunication Engineering. College of Engineering & Management studies & Research, Kopri, Thane (E)-400603, India "Intelligent ambulance with accident detection and rescue system"
- [4] Niketa Chellani^{#1}, Chirag Tahilyani^{#1} ^{#1} Student, Electronics and Telecommunication Dept, TSEC, Mumbai University "Traffic Congestion Detection and Control using RFID Technology".
- [5] Patrick J. Sweeney II, "RFID for Dummies", by Wiley Publishing Inc.
- [6] <http://www.mkkyong.com/tutorials/android-tutorial/>